

Oroville Facilities Relicensing

Federal Energy Regulatory Commission, Project No. 2100



Engineering and Operations Resources
Work Group



Federal Energy Regulatory Commission, Project No. 2100

Oroville Facilities Relicensing

Study Plan No. E4

Flood Management Study





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Oroville Facilities Relicensing

Study Plan No. E4: Flood Management

Introduction/Background

- Flood protection 1964.
- Flood protection and health, safety and economy.
- Disastrous floods of 1986 and in 1997.

Significant changes since 1967:

- Natural growth-development.
- Advances in hydrology, hydraulics and flood management
- Additional water storage facilities in the basin.

This study would:

- Identify, and summarize flood studies by various agencies.
- Identify ways to improve flood protection.



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Study Plan No. E4: Flood Management

Study Goal(s) and Objective(s)

- Address specific issues identified in the scoping process
- Document current requirements, policies, and procedures, available information.
- Provide flood profiles, and flood plain maps.
- Summarize existing and on going studies.
- Update, if necessary, flood studies-current info./technology.
- Identify other flood control measures.
 - ✓ Advance Release/Forecast Based Operations
 - ✓ Alternative reservoir management strategies.
 - ✓ Additional flood control structures.
- Conduct, if necessary, new studies.



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Study Plan No. E4: Flood Management

Relationship to Relicensing Process

- The project adopted will be best adapted to a comprehensive plan for other beneficial public uses, including irrigation, **flood control**, water supply, and recreational and other purposes.
- The Commission shall consider the recommendations of Federal and State agencies exercising administration over **flood control**, ...

(TITLE 16-CONSERVATION, CHAPTER 12-FEDERAL REGULATION AND DEVELOPMENT OF POWER, SUBCHAPTER I-REGULATION OF THE DEVELOPMENT OF WATER POWER AND RESOURCES, Sec. 803 - Conditions of license generally)



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Study Plan No. E4: Flood Management

Relationship to Relicensing Process

Issues identified in the scoping process:

Issue Statement No. E5: Impact of flood releases on Lake Oroville dam (including need for access to north side of dam) and downstream facilities including downstream levee stability and potential for ameliorating downstream flooding through coordinated releases with other water storage facilities. Consider past floods, improvements in channel carrying capacities, need for more storage (e.g., installing Obermeyer gates on the emergency spillway ogee), operational changes, early warning system for downstream releases, and updating of flood operation manual.



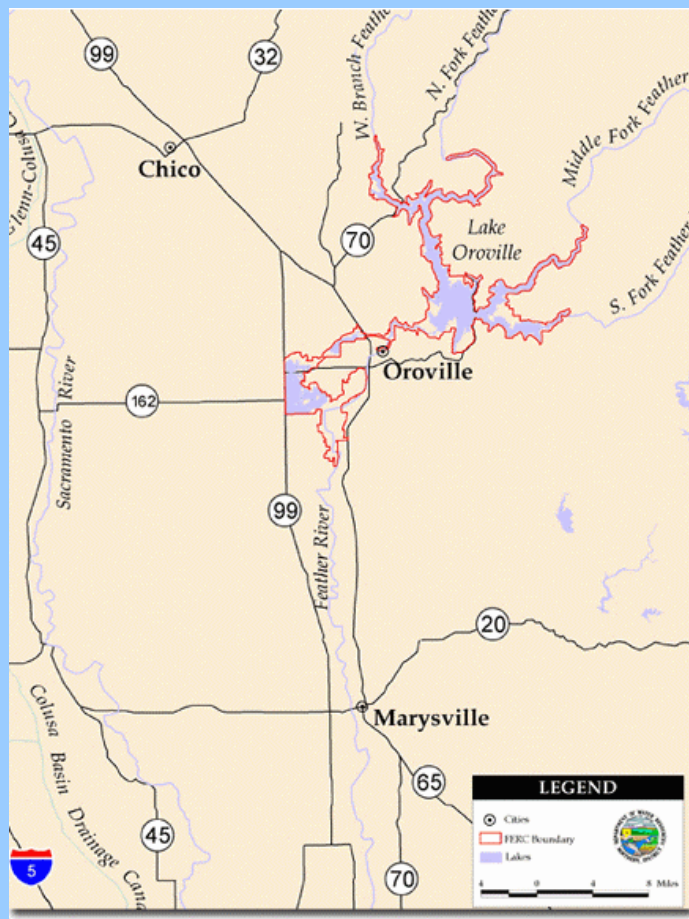
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Study Plan No. E4: Flood Management

Study Area

FERC Project 2100 Boundary and the Feather River upstream of the Oroville dam that forms Oroville Reservoir Watershed, and downstream to confluence with the Yuba River.



Map of Study Area (Placeholder for more accurate Map)



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Study Plan No. E4: Flood Management

General Approach

- Provide current information to address issues.
- Communicate with the appropriate agency/program to address the issues outside of the relicensing process.
- Summarize existing studies, and the available info. on studies in progress.
- If necessary Update/refine existing studies.
- Review the application of new concepts.
- Incorporate the results of the studies-in-progress of other agencies.



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Study Plan No. E4: Flood Management

Task 1: Review existing or in-progress studies

- **Oroville Dam-PMF (Probable Maximum Flood) Analysis 2001:**
 - DWR- about to completing an updated PMF analysis of Oroville Dam.
 - The PMF developed using HMR-58.
 - Routing through the Oroville Lake assuming:
 - Full or partial operation of all spillway gates
 - Criteria of Report on Res.Regulation for Flood Control (1970).
- **Inundation Studies:**
- **A. Flood Inundation Study of the Feather River by DWR- 1998**
 - Flow: 150,000 cfs (Standard Project Flood) and 400,000 cfs.
 - Compared water levels with January 1997 flood.
 - Only two cross sections were actually surveyed.
 - Steady Flow was assumed



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Study Plan No. E4: Flood Management

Task 1: Review existing or in-progress studies (contd.)

•Inundation Studies (Contd.):

B. Oroville Dam Inundation Maps -Corps of Engineers-2000

- The Corps prepared the Inundation Map in October 2000.
- Part of the Emergency Action Plan.

C. Feather River Backwater Analysis-Corps of Engineers 2001

- Water surface profile in the Feather River
- Not a Dam Break flood study, but a statistical flood analysis.
- Flood Frequency: 10, 50, 100 and 500 year.
- Floodway Analysis of the 100-year flood.
- Expected to be complete shortly, although firm schedule is not available.



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Study Plan No. E4: Flood Management

Task 1: Review existing or in-progress studies (contd.)

D. Forecast Based Operation.

Flood Management Plan for American River (Corps & USBR), The Comprehensive Study, (Corps-Reclamation Board), and the Yuba-Feather Flood Protection Program (Yuba County Water Agency).

- Rely more on the best available data and less on rule curve.
- Allow advance releases based on:
 - Inflow forecast by measuring precipitation in the watershed.
 - Use uncertainty estimates with best estimates of forecast hydrograph.



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Study Plan No. E4: Flood Management

Task 1: Review existing or in-progress studies (contd.)

E. Emergency Action Plan.

- EAP is a FERC required document
- Emergency: Impending or actual sudden release of water.
- Operating, mobilization & notification procedures during emergency.
- Impending flood condition, dam not in danger, large releases expected.
- Includes flood inundation maps, identification of life and property downstream that could be affected by a flood event or emergency, (dam failure under PMF or sunny day break under normal conditions).



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Study Plan No. E4: Flood Management

Task 2: Update/Refine Studies

- **PMF Study-** (If new info. is significant.)
- **Flood Inundation Maps, and Channel Capacity** (If caused by the relicensing process).
- **Forecast Based Reservoir Operation.** (If required due to local operations changes proposed in the relicensing process.)
- **Flood Operations Manual –Communicate with Corps.**



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Task 3: Coordinate with ongoing studies by other agencies

Yuba-Feather Flood Protection Program (Y-FFPP)

- Lake Oroville Enlargement-Gates on the ungated spillway.
- Thermalito Afterbay Emergency Re-Operation
- Forecast Based Operation of Oroville Dam

Sacramento and San Joaquin River Basins, Comprehensive Study

- Address flood damage reduction and ecosystem restoration.
- Master plan for flood management for the two river systems.
- Lead by Corps of Engineers, and California Reclamation Board.
- Conclude in 2002.

Sutter County Feasibility Study



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Results

- Inundation Maps for floods under present conditions.
- Identification of measures (structural/non structural) for flood protection provided by Oroville facilities.
- Quantitative/qualitative effects of measures proposed in updated or new studies in the following areas:
 - Water Supply
 - Environmental Impacts
 - Economics
 - Regulatory Environment
 - Recreation
 - Engineering

Products/Deliverables

A comprehensive report containing summaries of flood management studies, policies, procedures, and Inundation Maps.



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Coordination with Other Resource Areas/Studies

- Consultation-level linkage with:
 - Cultural Resources Work Group.
 - Recreation and Socioeconomic Work Group.
 - Land Use, Land Management and Aesthetics Work Group.
 - Environmental Work Group.
- **Organizations within DWR:**
Divisions of Engineering, Operations & Maintenance and Flood Management
- **Agencies with related activities:**
 - US Army, Corps of Engineers
 - US Bureau of Reclamation
 - Yuba County Water Agency
 - Butte County and Sutter County
 - City of Oroville and City of Yuba City